

BIOLOGICAL ASSESSMENT
for
Activities Related to
The Middle Citico Creek Environmental Assessment



**USDA-Forest Service
Cherokee National Forest
Tellico Ranger District
Monroe County, Tennessee**

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1.0 INTRODUCTION

The purpose of this biological assessment (BA) is to document any potential effects of the project on Threatened and Endangered (T&E) species or their habitats, and to ensure land management decisions are made with the benefit of such knowledge. Effects to Sensitive species are described separately in the project Biological Evaluation. The objectives of this assessment are to:

- 1) Comply with the requirements of the Endangered Species Act that actions by federal agencies not jeopardize or adversely modify critical habitat of federally listed species.
- 2) Provide a process and a standard by which T&E species receive full consideration in the decision-making process.

1.1 AFFECTED AREA AND SCOPE OF ANALYSIS

The project area is comprised of Compartments 9, 10, 11, 13, 14, 15, 16, 17, 22, 23, 24, 25, 31, 32, 33, 40, 41, 42, 51, 402, 403, 404, 405, 406, 428, 429 and 430 and located northeast of Tellico Plains, Tennessee (See Figure 1).

Unless otherwise described in the sections below, analysis of direct and indirect effects to T&E species is primarily focused within the boundaries of the individual activities proposed within the project area. The timeframe for short-term effects is within the first three years after treatment because soil loss following ground disturbing activities has been shown to drop to pretreatment levels in that time period (Swift 1985). Long-term effects last for up to ten years because five years are needed for full ground cover restoration (required time frame for a timber stand to be re-established) plus an additional five years to allow the stand to grow out of the seedling stage and become more stable on the landscape. This ten year period also coincides with the planning time frame which restricts subsequent entries into the area.

Analysis of cumulative effects is limited to those effects of future State or private activities, not involving Federal activities, which are reasonably certain to occur within the action area of the Federal activity subject to consultation. No State or private activities are known for the project area; consequently, there would be no cumulative effects and they would not be discussed further in this document.

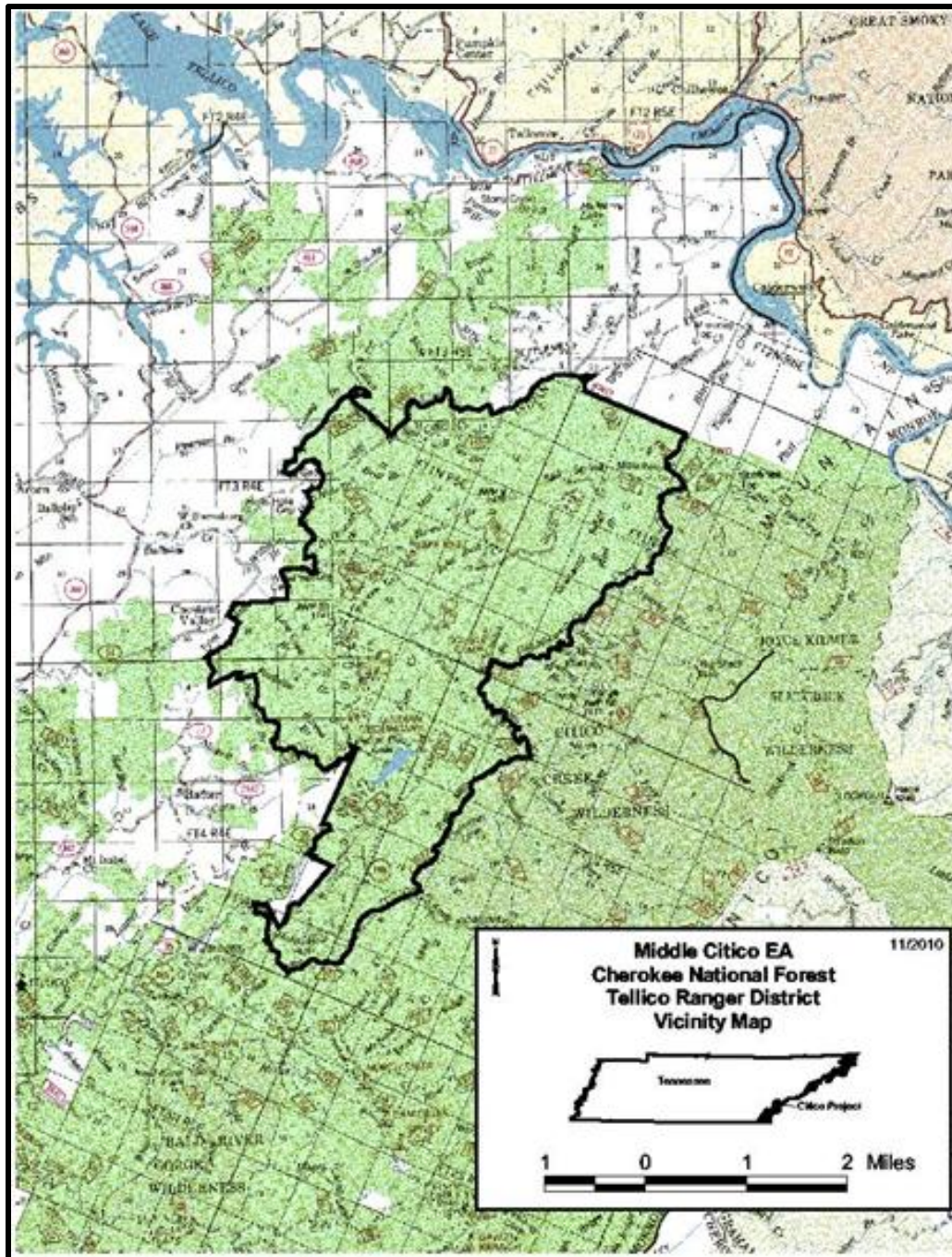


Figure 1. Vicinity Map

1.2 PREFERRED ALTERNATIVE

Silvicultural Treatments

1) Maintain or restore natural oak and oak-pine communities and create early successional habitat through silvicultural treatments on approximately 52 acres of existing forested stands. Activities would occur in the stands listed in Table 1.

Table 1. Oak and oak-pine maintenance/restoration

Comp/Stand	Acres	Type of Harvest	Reforestation	Age	Community Type
14/23	25	Shelterwood w/reserves	Slashdown site preparation, plant white oak on 30' x 30' spacing, 2 nd year chemical release of oak seedlings.	40-50	Conifer-Northern Hardwood
31/6	10	Shelterwood w/reserves	Natural regeneration	80-90	Conifer-Northern Hardwood
32/28	17	Shelterwood w/reserves	Slashdown site preparation, plant white oak on 30' x 30' spacing, 2 nd year chemical release of oak seedlings.	80-90	Dry to Mesic Oak

2) Maintain or restore shortleaf pine, pitch pine and associated pine-oak communities and create early successional habitat through silvicultural treatments on approximately 105 acres of existing forested stands. Activities would occur in the stands listed in Table 2.

Table 2. Pine maintenance/restoration

Comp/Stand	Acres	Type of Harvest	Age	Community Type
15/08	40	Seedtree w/reserves	60-70	Conifer-Northern Hardwood
15/27	18	Seedtree w/reserves	80-90	Xeric Pine-Pine Oak
24/19	40	Seedtree w/reserves	70-80	Xeric Pine-Pine Oak
24/21	22	Seedtree w/reserves	70-80	Xeric Pine-Pine Oak
24/23	19	Seedtree w/reserves	70-80	Xeric Pine-Pine Oak
24/26	24	Clearcut w/reserves	80-90	Xeric Pine-Pine Oak
25/36	5	Clearcut w/reserves	80-90	Xeric Pine-Pine Oak
32/27	36	Seedtree w/reserves	80-90	Conifer-Northern Hardwood

3) Improve forest health and species composition and promote advanced oak regeneration using intermediate stand treatments of approximately 94 acres. Activities would occur in the stands listed in Table 3.

Table 3. White pine removal

Comp/Stand	Acres	Type of Harvest	Age	Community Type
15/13	28	Thinning	30-40	Conifer-Northern Hardwood
15/14	18	Thinning	30-40	Conifer-Northern Hardwood
15/15	33	Thinning	30-40	Conifer-Northern Hardwood
31/18	15	White pine removal	80-90	Conifer-Northern Hardwood

Wildlife Habitat Improvements

1) Create approximately 621 acres of open pine-oak woodlands on sites that would naturally support these communities. Pine-oak woodlands are open canopy, fire-dependent, less densely forested vegetative communities of the pine-oak dominated systems on the Forest. The defining characteristics of this community are canopy closure less than 60%, abundant herbaceous (grass/forb) groundcover, and a mix of pine and oak among the dominant canopy trees. The desired total residual basal area ranges between 50 and 70.

Treatments associated with creating woodland conditions may include dormant and/or growing season prescribed burning on a rotation suitable to reduce woody vegetation in the understory and encourage establishment of desired herbaceous vegetation. In order to achieve desired woodland conditions of a grass/forb understory and reduce the woody understory component, woodland areas may need to be initially prescribed burned on a shorter rotation (every 1-2 years) than that proposed under the Prescribed Burning section. Therefore, woodland burn blocks have been proposed to achieve this goal (see Table 4). Once woodland areas are established in grass/forb understories and the woody understory is reduced, woodland areas would be placed on a longer burn rotation (every 3-5 years) to maintain this herbaceous understory.

Prescribed burns would be lit from ridge tops and allowed to back down slopes into riparian areas and more mesic forest stands. In order to minimize fireline construction, burn block boundaries would extend to natural or man-made fire breaks, such as streams, roads, and trails. Approximately 2 miles of handline would need to be constructed for these woodland prescribed burns.

In addition to prescribed burns, other vegetation management activities may include:

- Herbicide (triclopyr and/or glyphosate) application to reduce sprouting of woody vegetation;
- Thinning of overstory trees using hand tools and/or mechanical equipment; and
- Cutting of understory and midstory vegetation using hand tools and/or mechanical equipment to expose the forest floor to additional sunlight.

Thinning operations may include commercial timber sales, non-commercial methods (cut and leave), or a combination of both. The stands vary considerably from xeric pine and oak to more mesic coves. Treatment would occur in the more xeric portions of the stands listed in Table 4.

2) Install ephemeral pools using heavy equipment in temporary roads, old logging roads, skid trails, gated roads, and log landings within the project area previously covered by biological surveys (approximately 10-30 pools up to 0.1 acre each).

Table 4. Woodland creation

Comp/Stand	Acres	Treatment
Gold Cabin Branch		
15/18	19	Thin, herbicide
15/19	10	Thin, herbicide
15/20	27	Thin, herbicide
15/21	18	Thin, herbicide
15/23	24	Thin, herbicide
15/39	20	Thin, herbicide
23/4	15	Thin, herbicide
23/10	91	Thin, herbicide
Total	224	
Total Gold Cabin	2,271	Burn
Footes Creek		
31/8	14	Thin, herbicide
31/15	22	Thin, herbicide
Total	36	
Total Footes Creek	209	Burn
Bivens Branch		
16/8	31	Thin, herbicide
16/12	17	Thin, herbicide
405/9	76	Thin, herbicide
406/7	89	Thin, herbicide
406/3	13	Thin, herbicide
406/2	52	Thin, herbicide
406/12	39	Thin, herbicide
406/6	44	Thin, herbicide
Total	361	
Total Bivens Branch	927	Burn

3) Daylight linear wildlife openings by removing trees up to 25 feet from either side of National Forest System Roads (NFSR) 36 Tavern Branch (0.75 miles), NFSR 40321 East Miller Ridge (1.25 miles), and NFSR 2604 Gold Cabin Branch (2 miles). Trees would be removed to allow sunlight to reach the road. Not all trees would be removed. The effect would resemble heavy thinning of trees that are merchantable. In some areas, no trees would be cut. Day lighting would promote a flush of herbaceous vegetation along the road edge, beneficial to wildlife for habitat and food. This management technique would also allow more sunlight to reach areas of shaded road. Shaded areas inhibit the growth of seed planted for wildlife forage.

4) Plant native hard or soft mast producing trees and/or shrubs in log landings, temporary roads, or other open areas created by project activities to increase the amount and quality of mast producing plants in the project area (approximately 10 acres within project area).

5) Install nest/roost boxes in openings to provide nesting/roosting structures for birds and small mammals where natural cavities are limited (approximately 100 boxes in the project area).

Prescribed Burning

Prescribe burn the following units totaling approximately 18,600 acres: T05 Okra Top, T04 Bivens Branch, T07 Blue Mountain, T09 Cow Camp, T08 Jake Best, T06 Bark Camp, T10 Miller Ridge, T11 Flats Footes Branch, and T15 Flats Mountain. Streams, roads, trails and hand line would be used as fire lines. Approximately 1.3 miles of ground disturbance is also needed for fuel reduction fire lines. Ignition through aerial and/or hand torching would occur along ridgelines with fire allowed to back on to lower slopes. Not all units would be burned in the same year.

Transportation System

1) Reconstruct approximately 10.1 miles of existing NFSRs to bring them up to haul standards. Work would primarily consist; of widening curves, placing spot gravel, brushing, minor re-shaping, cleaning and constructing dips and other drainage structures to improve overall drainage, upgrading culverts, and replacing gates.

2) Decommission a portion of NFSR 36-1 (3 mi.) and 284F (0.3 mi) to reduce sediment runoff. Decommissioning would involve; repairing ruts/erosion, constructing water bars on grades that drain towards creek crossings, seeding the roadbed in areas where no vegetation exists and blocking the road with an earth berm. NFSR 36-1 would not be decommissioned until the new trails are in place.

3) Rehabilitate 0.15 mile of unauthorized road/trail using a combination of biotechnical techniques, rip rap and other materials to reconstruct the channels and banks. The unauthorized road along a tributary to Little Citico Creek has diverted the stream from its channel, resulting in continuing erosion and sedimentation. Heavy equipment may be used during rehabilitation.

4) Perform maintenance on NFSRs needed for timber haul.

5) Add existing roads to the system: NFSR 2659A (0.1 mile) and 40321 (0.3 mile). NFSR 2659A accesses an existing spot wildlife opening and is also included in routine maintenance figure above. NFSR 40321 is an extension of the existing road to access a stand and is also included in the 10.1 miles of reconstruction listed above.

Recreation Management

1) Improve existing equestrian (or recreational stock) opportunities in the Middle Citico project area by managing approximately 39.9 miles of NFS roads and trails for equestrian use. Additional equestrian opportunities would be composed of approximately 23.8 miles of existing NFSRs and 16.1 miles of non-motorized connector trails. All trails would remain open to foot traffic. Bicycle use would not be allowed within Citico Creek Wilderness, but would be allowed on NFS roads and trails unless otherwise posted. The items listed below are included in the total mileage listed above.

- **Construct approximately 1.2 miles of connector trail** from Young Branch Campground to Little Citico Bridge. This would provide access to the Little Citico Complex from the campground.
- **Close approximately 2.6 miles of trails.** Trail 165-1 (1 mile) and Trail 165-2 (1.6 miles) would not be closed until the connector trail is constructed.
- **Add approximately 15.2 miles of trail.** The trails would be either newly constructed trails (using hand and/or mechanical tools and equipment) or utilize linear wildlife openings, old logging roads, or skid trails.
- **Reclassify Mill Branch Hiking Trail** (Trail 96/2.3 miles) to allow equestrian use of the trail. Reroute approximately a 0.5 mile portion to meet Forest Service equestrian trail standards.
- **Add NFSRs** 402301, 2659, 2604, additional mileage of 2403 and 5022, 2033, 36, 36-1, 29, 40251, 40252, 403101, 40321, 442801, 5003, and 44291 be managed as part of the trail complex.

2) Relocate approximately 1,300 feet of Trail 165-3. This segment of Trail 165-3 would be designed to sustain equestrian use.

3) Construct a parking area, designed for horse trailers, of approximately 1.5 acres at the end of NFSR-44291 (Miller Ridge area). A non-potable well, for watering horses, and a vault toilet would be installed at the parking area. This parking area could provide an access to the Little Citico Complex.

4) Convert a portion of Young Branch Campground to a parking area to provide for day use parking for equestrian users. Approximately four campsites as well as some stalls would be removed and converted to 4-5 parking spots. The conversion would stay within the confines of the existing facility site.

5) Construct a non-potable well at Young Branch Campground for watering horses.

6) Install barricades at two locations to prevent equestrian access to Citico Creek. Barricades would be placed at Trail 165-2 trailhead (Little Citico Bridge) and Trail 165-1 trailhead (across from Young Branch Campground).

7) Install kiosks or develop other educational methods in the Citico Creek corridor to provide information to visitors about Citico Creek.

8) Close Citico Creek proper to equestrian use (on NFS lands) from Bark Camp Branch downstream to the Forest boundary. To be enforced by Regional Forest Closure Order restricting horses in the creek.

1.3 CONSULTATION HISTORY

Informal consultations between the Forest Service, Cherokee National Forest and the Fish and Wildlife Service, Cookeville, Tennessee began in early 2010 when Mary Miller (USFS) and Jim Widlak (USFWS) discussed all of the T&E species in the Middle Citico project area. Throughout 2011 and 2012: 1) Jim Herring (USFS) had numerous discussions with Peggy Shute

(USFWS) regarding smoky madtoms, yellowfin madtoms and Citico darters; 2) Laura Morris (USFS) and David Pelren (USFWS) discussed the Indiana bat; and 3) Mark Pistrang (USFS) and Geoff Call (USFWS) discussed the small whorled pogonia.

2.0 SPECIES EVALUATED AND METHODS USED

Analysis of the project was conducted using best available science. Using information from project area habitat conditions, species habitat requirements, species distributions, and limiting factors, the 33 T&E species agreed to by USFWS (Jennings 2011) were reviewed to determine if any T&E species were likely to occur in or near the project area. TES Maps that include Tennessee Natural Heritage and Cherokee National Forest data (CNF 2012) were examined to locate any records of T&E species currently in the project area. Surveys for T&E fish are conducted multiple times each year through a partnership with Conservation Fisheries, Inc. (CFI).

Table 5 displays the 33 T&E know to occur on or near the Cherokee National Forest. This project would have no effect on 27 of the 33 T&E species because they have restricted ranges that do not include the project area. The spruce-fir moss spider, Carolina northern flying-squirrel, spreading avens, Roan Mountain bluet, and Blue Ridge goldenrod are found only at high elevations (>4000 feet). The blue shiner, amber darter, Conasauga logperch, upland combshell, southern acornshell, fine-lined pocketbook, Alabama moccasinshell, Coosa moccasinshell, southern clubshell, southern pigtoe, Georgia pigtoe, ovate clubshell, and triangular kidneyshell are restricted to the Mobile River basin. The Ruth's golden aster is restricted to the Hiwassee and Ocoee Rivers. Virginia spiraea is only known, historically, from the Forest at a site on the Nolichucky River in Unicoi County. The gray bat may forage in the area along stream corridors, which are protected from projected activities. This bat utilizes caves year-round and no caves are known from the area. Unsuccessful surveys were conducted for spotfin chubs, Appalachian elktoe, tan riffleshell, and Cumberland bean pearly mussel. Suitable habitat could exist within the project area for the bog turtle and rock gnome lichen but these species are restricted to habitats (riparian areas and high elevation vertical rock faces) which are protected from ground disturbing activities.

Implementation of the Middle Citico Creek project would not affect any of the 27 T&E species discussed above. The remaining six T&E species (Indiana bat, small whorled pogonia, Citico darter, smoky madtom, yellowfin madtom, and snail darter) would be discussed in further detail to determine if implementation of the project would affect them.

Table 5. Threatened and Endangered Species of the Cherokee National Forest

Group	Scientific Name	Common Name	FWS	Habitat in Project Area	Further Analysis
Arachnid	<i>Microhexura montivaga</i>	spruce-fir moss spider	E	None	No
Fish	<i>Cyprinella caerulea</i>	blue shiner	T	None	No
Fish	<i>Erimonax monachus</i>	spotfin chub	T	Unsuccessful survey	No
Fish	<i>Etheostoma sitikuense</i>	Citico darter	E	Present	Yes
Fish	<i>Noturus baileyi</i>	smoky madtom	E	Present	Yes
Fish	<i>Noturus flavipinnis</i>	yellowfin madtom	T	Present	Yes
Fish	<i>Percina antesella</i>	amber darter	E	None	No
Fish	<i>Percina jenkinsi</i>	Conasauga logperch	E	None	No
Fish	<i>Percina tanasi</i>	snail darter	T	Downstream of PA	Yes
Mammal	<i>Glaucomys sabrinus coloratus</i>	Carolina northern flying squirrel	E	None	No
Mammal	<i>Myotis grisescens</i>	gray bat	E	None	No
Mammal	<i>Myotis sodalis</i>	Indiana bat	E	Potential habitat	Yes
Mollusk	<i>Alasmidonta raveneliana</i>	Appalachian elktoe	E	Unsuccessful survey	No
Mollusk	<i>Epioblasma florentina walkeri</i>	tan riffleshell	E	Unsuccessful survey	No
Mollusk	<i>Epioblasma metastrata</i>	upland combshell	E	None	No
Mollusk	<i>Epioblasma othcaloogensis</i>	southern acornshell	E	None	No
Mollusk	<i>Hamiota altilis</i>	fine-lined pocketbook	T	None	No
Mollusk	<i>Medionidus acutissimus</i>	Alabama moccasinshell	T	None	No
Mollusk	<i>Medionidus parvulus</i>	Coosa moccasinshell	E	None	No
Mollusk	<i>Pleurobema decisum</i>	southern clubshell	E	None	No
Mollusk	<i>Pleurobema georgianum</i>	southern pigtoe mussel	E	None	No
Mollusk	<i>Pleurobema hanleyianum</i>	Georgia pigtoe	E	None	No
Mollusk	<i>Pleurobema perovatum</i>	ovate clubshell	E	None	No
Mollusk	<i>Ptychobranhus greeni</i>	triangular kidneyshell	E	None	No
Mollusk	<i>Villosa trabalis</i>	Cumberland bean pearly mussel	E	Unsuccessful survey	No
Reptiles	<i>Glyptemys muhlenbergii</i>	bog turtle	T	Riparian protection	No
Nonvasc. Plant	<i>Gymnoderma lineare</i>	rock gnome lichen	E	Riparian protection	No
Vascular Plant	<i>Geum radiatum</i>	spreading avens	E	None	No
Vascular Plant	<i>Hedyotis purpurea montana</i>	Roan Mountain bluet	E	None	No
Vascular Plant	<i>Isotria medeoloides</i>	small whorled pogonia	T	Potential habitat	Yes
Vascular Plant	<i>Pityopsis ruthii</i>	Ruth's golden asters	E	None	No
Vascular Plant	<i>Solidago spithamea</i>	Blue Ridge goldenrod	T	None	No
Vascular Plant	<i>Spiraea virginiana</i>	Virginia spiraea	T	None	No

3.0 HABITAT RELATIONSHIPS, EFFECTS ANALYSIS, AND DETERMINATIONS OF EFFECTS

3.1 Indiana bat *Myotis sodalis* - Endangered

The range of Indiana bat includes much of the Midwest, portions of New England, southeast and the south-central states, with accidental/irregular occurrences outside of this range. Only nine hibernacula in three states (KY, IN, MO) harbor 75% of the remaining population. This bat has only been documented in Monroe County (summer) on the Cherokee National Forest. In the Southern Appalachian region, females currently establish primary maternity roosts under the sloughing bark of dead yellow and white pines and eastern hemlock (O'Keefe, personal communication, 2012). Single bats may use a variety of tree species for roosts, as long as there is available sloughing bark or crevices on those trees. The majority of roosts are on mid and upper slopes in mixed pine-hardwood stands, but some roosts have been found near streams. This bat forages for flying insects along river and lake shorelines, in canopy gaps over upland waterholes, and along roads and trails. Caves are used for hibernacula. The Indiana bat returns to hibernacula beginning in late August (NatureServe 2012).

A threat to this bat species is the discovery of a fungus known as white-nose syndrome. This fungus attacks bats while they are hibernating. First discovered in New York in 2006, the fungus has now spread and resulted in mortality to an estimated six million bats in over a dozen states. White-nose syndrome was first discovered in Tennessee in 2010, and is now known from eleven counties within the state (White-nosed Syndrome.org 2012). Efforts are underway to create a treatment or cure for the disease, but no treatments are currently available. Consequently, large scale population declines are expected over the next several years as the disease continues to spread. No hibernacula are known from the Cherokee National Forest, but one is located in the Great Smoky Mountains National Park, where several maternity roosts have been located. Four additional hibernacula are located within 40-70 miles of the Cherokee National Forest.

Suitable maternity and roosting habitat occurs within the watershed project boundary. The nearest known Indiana bat maternity colony occurs over 2.5 miles from the project boundary. The closest capture site of a single Indiana bat occurs approximately 1.5 miles from the project boundary (Monroe County records). Only one male Indiana bat was captured on the Cherokee National Forest during spring-summer 2011 mist net surveys (approximately 2.5 miles from the project boundary). Two new maternity roost trees were discovered during spring-summer 2012 surveys (O'Keefe, personal communication, 2012). These new maternity sites are not in the project area.

Standards:

The following standards from the Forest Plan (USDA Forest Service. 2004a) for Indiana bat would be applied when implementing project activities:

- Provide high quality foraging, migration, and maternity habitat for Indiana bat (Forest Objective).
- Snags with exfoliating bark are not intentionally felled unless necessary for public safety.

- Tree removal in riparian corridors may only take place if needed to enhance the recovery of plant diversity, disturbance rehabilitation, and habitat improvement for TES or riparian species, reduce fuel buildup, provide for safety, accommodate appropriate recreational uses, or for approved facility construction/renovation.
- **FOREST REGENERATION TREATMENTS > 10 ACRES:** When implementing regeneration treatments, a minimum average basal area of 15 square feet per acre is retained throughout the rotation. In some portion of the treatment area, residual basal area should be clumped or left in travel corridors. All snags and all shagbark hickory over 6 inches (diameter at breast height) are retained except those that are immediate hazards. If additional trees are needed to meet the basal area requirements, priority should be given to hollow/den trees or trees that exhibit, or are likely to develop, characteristics favored by roosting Indiana bats. Snags do not count toward the leave basal area. Borders of clearcut units would be irregularly shaped.
- **FOREST REGENERATION TREATMENTS < 10 ACRES:** No residual retention basal area (live trees) is required. All snags would be retained unless they are immediate hazards. Shagbark hickories greater than 6 inches (diameter at breast height) are retained.
- During all silvicultural treatments, retention priority is given to the largest available trees that exhibit characteristics favored by roosting Indiana bats.

Scope of Analysis for Indiana bat:

The areas considered in analysis of direct and indirect effects include the treatment areas. Cumulative effects analysis (pertaining to Indiana bat habitat) considers activities planned within the next ten years on private lands within a one-kilometer buffer around the proposed Middle Citico Creek project boundary. This boundary was selected based on the distance reproductively active Indiana bat females travel in order to find optimal roost conditions (USDA Forest Service 2005).

EFFECTS – Indiana bat

Direct Effects - Indiana bat

Under the proposed actions, heavy equipment operation and tree felling may cause individual bats to fly out of trees or cause bats to be crushed if trees containing roosting bats are cut down or pushed over during implementation. Prescribed burning may directly affect individual bats roosting in trees. To date, no known maternity colonies exist within the analysis area. However, should maternity colonies be present in growing season burn areas, there may be adverse effects to flightless bats. If maternity colonies are discovered within burn units, late growing season burns would be conducted after August 15 to avoid injury to flightless bats. Bats in roosts may be exposed to gases and heat in the plume generated by the spreading fire. Exposure would depend on how high bats roost aboveground, fire behavior, winds, and terrain. However, mobile bats should be able to emerge from roosting after fire ignition. If bats leave roost trees during prescribed burns, bats are likely to return to the burn area after completion of the burn. The likelihood of any adverse effects toward Indiana bats are anticipated to be minimal, because: 1) no known maternity colonies or records of Indiana bats are known from the analysis area; 2) activities would not occur simultaneously but over an approximate 10-15 year implementation period; and 3) standards would be followed (except prescribed burning may occur after May 1). Herbicide applications would not have any direct effects on bats because herbicide would be

applied directly to vegetation and it is unlikely that they would come in to contact with any insects exposed to herbicides. However, should bats encounter insects exposed to herbicides, triclopyr and glyphosate are considered low to practically non-toxic towards mammals (USEPA 1993, 1998, SERA 2011a, SERA 2011b).

Indirect Effects - Indiana Bat

Under the proposed actions, openings would be created and/or maintained through tree removal, prescribed fire, herbicide application, and heavy equipment use. During harvest activities, standards from the Forest Plan would ensure roosting habitat would remain in harvested units. Snags with exfoliating bark would also be retained unless removal for safety to the public was necessary. Herbicide application used in silvicultural and wildlife activities would help create/maintain open forested stands. Mowing and herbicide application in wildlife openings would also maintain existing openings. Open areas would increase sunlight on the forest floor, increasing herbaceous growth for bats' insect prey (Taylor 2006). Bats may also benefit from reduced clutter in the canopy and a more open flight space. Construction of ephemeral pools in open areas would also provide additional feeding and drinking sites for bats. Activities such as trail and temporary road construction, and maintenance of linear wildlife openings may be beneficial by providing additional or maintaining travel corridors within the project boundary.

Although prescribed fire activities may eliminate some potential roosting and maternity colony snags or live trees, fire would also create new snags, providing additional roosting habitat. Suitable habitat would remain within the burned area, so long-term population changes are expected to increase due to improved habitat conditions. There is a need to create new snags as old snags deteriorate and lose sloughing bark. Since roost trees are ephemeral, bats are adapted to finding new roost trees should previous roosts be lost during the fire (O'Keefe 2011). Placing artificial roost habitat in areas such as log landings and wildlife openings may also help offset any potential roost trees lost during management activities. Growing season burns would be essential to successful establishment of woodlands. Woodlands would provide an open forest structure important to bat habitat.

Overall, indirect effects from the proposed activities would improve bat roosting and foraging habitat across the landscape and manage the pine-oak forests these bats prefer.

Cumulative Effects - Indiana Bat

Private land within the analysis area is predominantly in forested condition and no known future activities on private lands are expected to occur. Therefore, no cumulative effects to Indiana bats would occur.

Determination of Effect – Indiana bat

The proposed alternative “may affect, likely to adversely affect” Indiana bat.

3.2 small whorled pogonia *Isotria medeoloides* - Threatened

No threatened, endangered, or candidate for federal listing plant species were found during the botanical surveys within any areas of proposed ground disturbance for this project. Potential

effects to one federally listed plant species (*Isotria medeoloides*) are considered as this species could have habitat within the burn blocks where surveys were not conducted.

Small whorled pogonia is a federally threatened species that has an historic range that includes most of the eastern United States. Despite its wide geographical distribution however, it is extremely rare throughout its range. According to NatureServe (2012) this is “a widely distributed species with approximately 93 extant sites with better than poor viability known. The largest cluster of sites is centered around the Appalachian Mountains of New England and coastal Massachusetts, with two moderate-sized clusters centered around (1) the southern Appalachians and (2) the Coastal Plain and Piedmont of Virginia, Delaware, and New Jersey. There are also a few widely scattered outlying sites. Populations are typically very small and the total number of individuals is estimated to be less than 3000.”

The species is known to occupy a wide range of habitats, thus making it one of the more difficult species to look for based upon habitat parameters. The Recovery Plan (USDI FWS1992) describes habitat requirements as follows: “The small whorled pogonia occurs on upland sites in mixed-deciduous or mixed-deciduous/coniferous forests that are generally in second- or third-growth successional stages. Characteristics common to most *Isotria medeoloides* sites include sparse to moderate ground cover in the species’ microhabitat, a relatively open understory canopy, and proximity to features that create long-persisting breaks in the forest canopy. Soils at most sites are highly acidic and nutrient poor, with moderately high soil moisture values. Light availability could be a limiting factor for this species.” However, in regards to the description of “typical” habitats and site conditions, the recovery plan also states “Beyond this “common ground” of habitat characteristics, there are a myriad of exceptions and variations that may occur regionally and/or locally.” According to NatureServe (2012), typical habitats include “acidic soils, in dry to mesic second-growth, deciduous or deciduous-coniferous forests; typically with light to moderate leaf litter, an open herb layer (occasionally dense ferns), moderate to light shrub layer, and relatively open canopy. *Isotria medeoloides* frequently occurs on flats or slope bases near canopy breaks.” “Nearly all *Isotria medeoloides* populations are described as occurring in “second growth” or successional forest communities. This fact alone should not elicit the notion that *Isotria medeoloides* therefore requires such relatively young-aged forests. Rather, *Isotria medeoloides* is a forest plant and virtually all forests in the region reflect past logging or clearing.” (NatureServe 2012)

EFFECTS – small whorled pogonia

Direct and Indirect Effects – small whorled pogonia

All areas of proposed ground disturbance associated with timber harvest and related activities, transportation improvements, trail and parking area construction, and proposed control lines for prescribed burns were surveyed (Copperhead Environmental Consulting, Inc 2008 and May 2012) in order to analyze the potential effects. Small whorled pogonia was not found within any surveyed area and thus no effects to the species from ground disturbing activities would occur.

The use of herbicides as a part of the various silvicultural activities that are proposed would conform to standards outlined in the Forest Plan (USDA Forest Service 2004a) that are designed to eliminate any potential effects to TES plant species (FW Standard 87). Based on this, there would be no effect to the species from herbicide use.

Prescribed burning for fuel reduction and site preparation would be conducted during the dormant season and would have no effect; however, the prescribed burning to create woodlands in this alternative allows for either dormant or growing season burns.

There appears to be little to no current information in the literature regarding the effects of fire on this species (Hessl and Spackman 1995), however, in a paper entitled “The Effects of Fire on Rare Plants” (Owen 2004), the effect of fire was classified for all 186 federally listed, proposed, or candidate plant species that were known to occur on federal lands at that time. Plants were classified into four categories; those that require fire, those that tolerate it, those that are never exposed to fire based upon their habitats, and those that are adversely affected by fire. While not specifically mentioned in that paper, *Isotria medeoloides* was lumped into the group of species that is tolerant of some fire based upon habitats in which it is found (personal communication Wayne Owen 2005). There is no mention of fire within the 78 page recovery plan for this species (USDI FWS 1992) though the plan does state that the species tends to occur on sites with soils that have relatively high moisture content. This suggests the species would occur within vegetative communities that would only burn during periods of drought. There are currently no records of this species on the Cherokee National Forest. There are two known occurrences within the state of Tennessee, one located in Washington County on private land near the Forest and the other in extreme western Hamilton County.

The Cherokee National Forest has been conducting botanical surveys on all areas of proposed ground disturbing activities for well over 20 years. Many thousands of acres representing all major habitat types on the forest have been inventoried, and this species has never been detected. Habitat modeling developed in the northeast United States where the species has many more known occurrences suggests that occupied sites require overland vernal flows in conjunction with an impervious soil layer which lead to the seasonal high moisture content of soils (vonOettingen, pers com. 12/10/12). While the project area falls within the overall range of the species, the lack of previous detections combined with the xeric nature of the habitat within the proposed prescribed burn areas presents an extremely low likelihood that the species would be present. Based upon this any potential impacts to the species would be discountable, and the finding would be “not likely to adversely affect” for this species.

Cumulative Effects – small whorled pogonia

No known cumulative effects would occur in the project area because no known State or private activities are reasonably certain to occur within the project area. Therefore, no cumulative effects to small whorled pogonia would occur.

Determination of Effect – small whorled pogonia

The proposed alternative “may affect, not likely to adversely affect” small whorled pogonia.

3.3 Four listed fish – smoky and yellowfin madtoms, Citico and snail darters

smoky madtom *Noturus baileyi* - Endangered

This catfish inhabits large streams with low gradients at low elevations. It prefers transitional areas between pools and riffles (Etnier and Starnes 1993); shallow riffles containing flat, palm sized slab rocks, pea sized gravel; and deep pools (during colder months) (Dinkins 1984) with silty/sandy bottoms with large boulders (Biggins 1985). It seeks cover under boulders when

disturbed. This species is nocturnal. Excess sediment may be detrimental to its survival. This species is endemic to the Little Tennessee River system and occurs naturally only in Citico Creek on the Cherokee National Forest. Critical habitat is defined for Citico Creek: “from the Cherokee National Forest boundary at Citico Creek Bridge on Mountain Settlement Road upstream to the confluence of Citico Creek and Barkcamp Creek...” (Dinkins 1984). Part of the project area lies within designated Critical Habitat for this species. Two non-essential, experimental, populations have been established: one in Abrams Creek and the other in Tellico River.

The population of smoky madtoms in Citico Creek has been monitored since 1986 (Figure 2) (CNF 2012). The correlation coefficient of this population against time is $R^2 = 0.89$ which is a strong correlation indicating that this population is increasing in numbers.

The steady upward growth of the smoky madtom population in Citico Creek does not mean this population is secure. Moyer and Williams (2012) found a low level of genetic diversity in the smoky madtom population and emphasized “... the importance of protecting these species from further genetic and demographic bottlenecks.” Dr. Mel Warren (Research Biologist - Team Leader USDA Forest Service Southern Research Station) reviewed the Moyer paper (unpublished) and commented (Warren 2012) “... Another aspect related to low genetic diversity, that is not really addressed in the paper, is that of a stochastic event (increased sediment loads, herbicide spill or accidental spraying, natural event) reducing population sizes and further reducing allelic richness and genetic diversity. Given the genetic data, I think most conservation geneticists would agree that anything that reduces population size much below what you have really would dramatically increase the risk of them winking out.” Figure 3 attempts to display how population numbers for a species may continue to increase while the threat to extinction remains high. When a population is severely impacted much of the genetic diversity is lost; the offspring of the survivors are all closely related; and subject to the same threat. Centuries may be required to be restored the genetic diversity (through mutations) (Moyer and Williams 2012).

yellowfin madtom *Noturus flavipinnis* - Threatened

This catfish inhabits large streams to large rivers with a low gradient at lower elevations. It occurs in pools associated with cover such as flat rocks for spawning and leaf packs for shelter (USDI FWS 1983). This species is nocturnal. Excess sediment may be detrimental to its survival (Shute, 1984). It is endemic to the upper Tennessee River and occurs on the Cherokee National Forest in 2 miles of Citico Creek, in the Powell River in northern Tennessee, and in Copper Creek in Virginia. Two non-essential, experimental, populations have been established in Abrams Creek and in the Tellico River.

The population of yellowfin madtoms in Citico Creek has been monitored since 1986 (Figure 2) (CNF 2012). The correlation coefficient of this population against time is $R^2 = 0.59$ which is a medium correlation indicating that this population is increasing in numbers. The discussion above regarding the upward growth of the smoky madtom population applies also to the yellowfin madtom population.

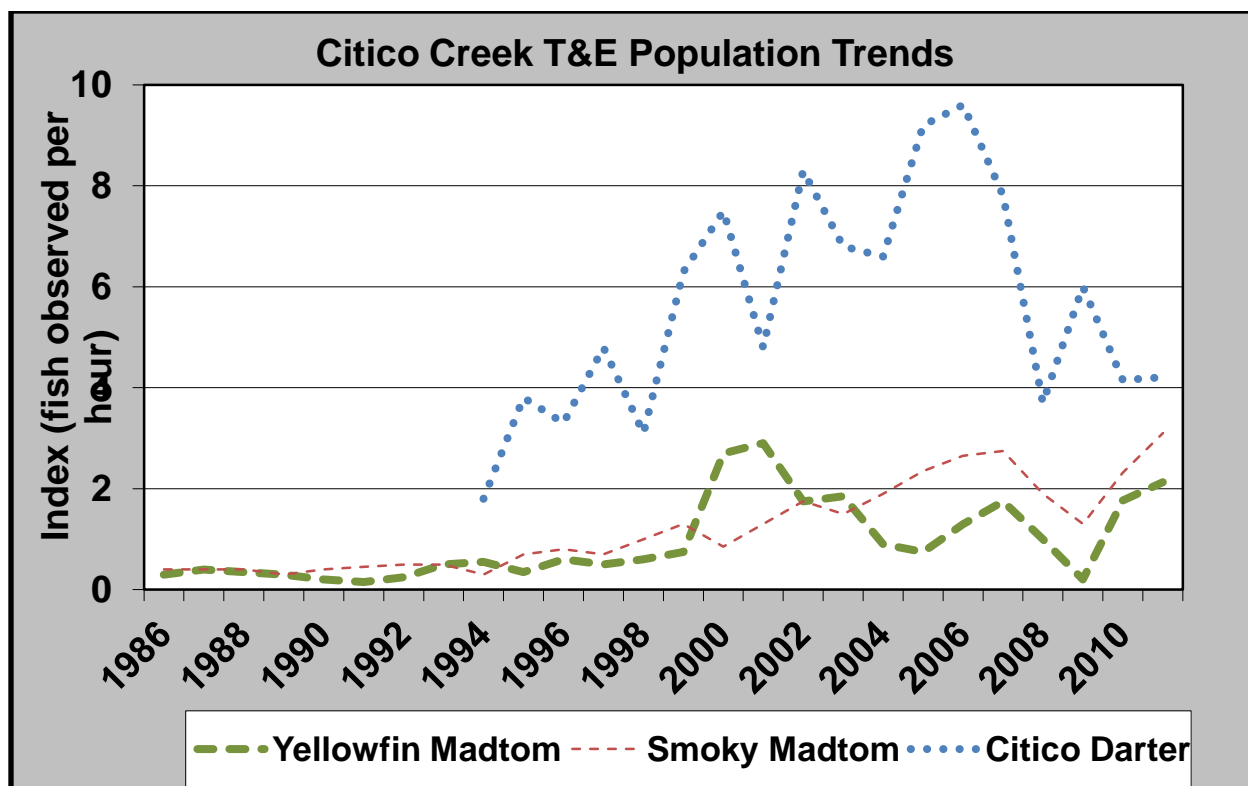


Figure 2 Monitoring data for yellowfin madtom, smoky madtom and Citico darter in Citico Creek.

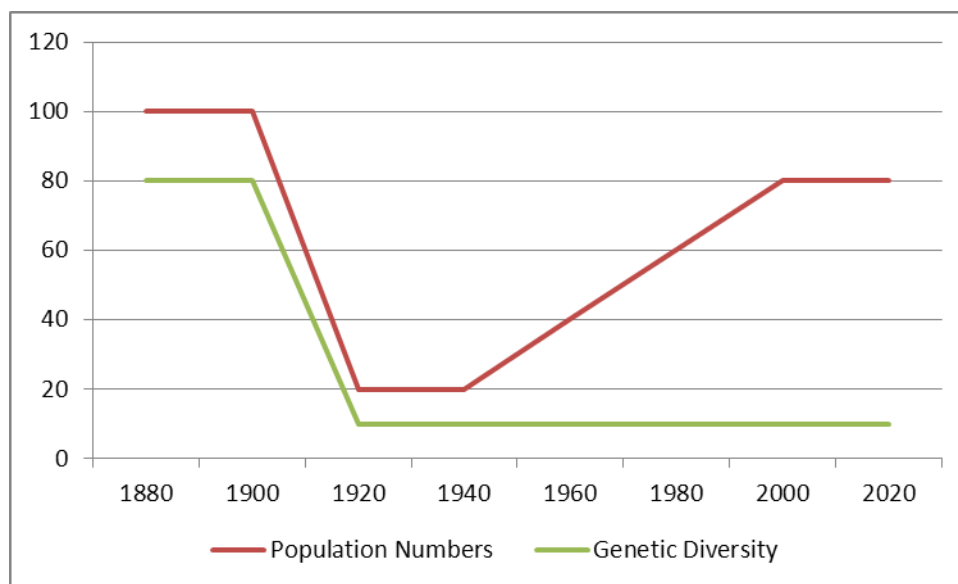


Figure 3 When population numbers of a species are dramatically reduced, the genetic diversity is also reduced. As the population grows, it appears to be healthy but the individual animals are nearly identical (genetically) and subject to the same threats.

Citico darter *Etheostoma sitikuense* - Endangered

This fish inhabits large streams with low gradients at low elevations. Citico darters are usually found in the transitional zone between riffles and pools. They were never observed in pool habitats even when suitable slab rocks were present (Shute, Rakes and Shute, 1997). Flat rocks for spawning and hiding cover are essential (Shute, Rakes and Shute, 1997). Excess sediment may be detrimental to its survival. Formerly known as the duskytail darter, this species is endemic to tributaries of the Tennessee River system and occurs naturally only in Citico Creek on the Cherokee National Forest. Two non-essential, experimental, populations have been established in Abrams Creek and in the Tellico River.

The population of Citico darters in Citico Creek has been monitored since 1994 (Figure 2) (CNF 2012). The correlation coefficient of this population against time is $R^2 = 0.36$ which is a medium correlation indicating that this population is increasing in numbers. The discussion above regarding the upward growth of the smoky madtom population applies also to the Citico darter population.

snail darter *Percina tanasi* – Threatened

The snail darter is endemic to larger tributaries of the Tennessee River from the Sequatchie River to the confluence of the French Broad and Holston River. Seven extant populations are known to persist. Snail darters are present on the Forest in the Hiwassee River. It occurs downstream of the Forest in the Ocoee River below Parksville Lake. Historically the snail darter was present in the Little Tennessee River upstream of the confluence with Citico Creek (Starnes 1977). This population was thought to have been eliminated in 1979 when the Tellico Dam was finished. However, in 2007 a single individual was captured by Charlie Saylor, TVA Fisheries Biologist in Citico Creek at the Forest Service boundary (CNF 2012). Preferred habitats for the snail darter include large rivers with low gradients, at low elevation. Tributaries to the Tennessee River as large as the Tellico River are considered too small for this species (Starnes 1977). They are typically found in gravel shoals; live for two years; spawn in February in sand/gravel substrate and provide no protection to the eggs or young; larva drift large distances downstream as they mature and migrate back during their first year; primary food items are snails (Starnes 1977). The major threat to their persistence is impoundment of flowing habitat.

EFFECTS – Citico darter, smoky and yellowfin madtoms and snail darter

The habitat requirements and sensitivity to habitat changes of the Citico darter, smoky madtom, yellowfin madtom and snail darter are very similar because they are all stream dwelling fish. While their aquatic microhabitat needs are different, the potential affects to the aquatic environment would affect these species similarly. The species are analyzed together except where specific differences are identified.

Direct Effects – smoky and yellowfin madtoms, Citico and snail darters

Direct effects to aquatic species only happen when activities occur within the confines of the stream channel; all other effects, principally sedimentation and herbicides, are indirect effects since they only affect the aquatic habitat (including designated Critical Habitat). No activities are proposed within the stream channel; however, two activities which presently occur within the stream channel would be reduced: rock dam building and horse use of the stream channel.

Rock dams

Rock dams are built to provide campers with deep water for swimming and playing. While dam building is seen by the campers as a harmless pastime, it is, in fact, a very destructive activity. The isolated rocks that are usually scattered about in the stream channel are carried to the dam sites where they are concentrated and stacked on top of each other. The effect of the dams is to remove rocks from isolated locations where they provide unique, limited and important habitat features particularly for the Citico darter and smoky madtom. The rocks selected by campers for building their dams are the size desired by three of the federally listed fish (Dinkins 1984, Etnier, and Starnes 1993, and Shute 1984). These fish utilize the rocks for escape and hiding cover. They need the rocks to be sitting on top of loose gravel that can be excavated. Physically moving rocks for dam construction could disturb federally listed fish resulting in them being eaten because their escape cover has been removed or the destruction of an active nest. Yellowfin madtoms are less dependent on these habitat features but may require them for nesting and in juvenile stages. Snail darters are not known to utilize these habitat features extensively.

The dams not only concentrate the rocks but they transform the stream channel from the shallow riffle preferred by Citico darters and smoky madtoms into deep pools with abrupt cascades (Dinkins 1984, Etnier and Starnes 1993). Bank erosion may also occur with some of the dams.

All of this ongoing activity would be phased out through implementation of the proposed alternative which calls for building kiosks and/or other educational methods which would provide information to visitors about Citico Creek and improve public understanding of the aquatic habitats needs of the four federally listed fish.

The proposed alternative would convert of a portion of the Young Branch campground to day use and could increase the number of day users in Citico Creek. Day users, typically fishermen or picnickers, involved in different activities than overnight campers (Leslie Morgan 2012 personal communication) and are not expected to engage in dam building to the extent of campers.

Installing kiosks, developing public education programs, and removing dams after they are built would reduce the current direct effects on the Citico darter, smoky madtom (including the smoky madtom critical habitat) and yellowfin madtom and could greatly improve the aquatic habitat for these species. The snail darter is not known to utilize the cover rocks that are essential to the other aquatic T&E species and would not be affected.

Horse usage in Citico Creek

Young Branch Campground provides camping opportunities for horseback riders. Trail 165-1 is the only designated trail leaving the campground. It fords Citico Creek then ties into the Little Citico trail system. Horses crossing or watering in Citico Creek could disturb individuals or crush individuals or the nests of Citico darters, smoky madtoms or yellowfin madtoms. Snail darters are not known to utilize the cover rocks that are important to the other T&E species. The proposed alternative would eliminate Trail 165-1 and the designated crossing of Citico Creek. It would close that portion of Citico Creek managed by the Forest Service known to be occupied by any of the T&E fish to horses (Regional Forester closure order) and it would construct physical barriers to prevent horse access to Citico Creek from Young Branch Campground.

In order to provide horseback riders the opportunity to access the Little Citico trail system, a connector trail between Young Branch Campground and Little Citico Creek Bridge would be built. Barriers would be installed to prevent horses from accessing Citico Creek from Young Branch Campground. A non-potable well would be constructed at Young Branch Campground providing horses a convenient watering source away from both Citico Creek and Young Branch.

Implementation of the proposed action to restrict horse access into Citico Creek would reduce direct effects to the Citico darter, smoky madtom (including the smoky madtom critical habitat) and yellowfin madtom in Citico Creek. There would be no direct effects to the snail darter because they are not dependent on the flat rocks for nesting and escape cover.

Indirect Effects – smoky and yellowfin madtoms, Citico and snail darters

Indirect effects to aquatic organisms arise from activities outside the stream channel that allow sediment, herbicides or other pollutants to enter and alter aquatic habitats. Reddington (2012) found that implementation of the proposed activities would result in an insignificant increase in sediment over natural sedimentation level. “Insignificant effects relate to the size of an impact and should never reach the scale where take of a listed species occurs. Based on best judgment, a person would not be able to meaningfully measure, detect, or evaluate insignificant effects.” (USDI FWS and NMRS 1998). Each of the proposed activities that have potential to contribute sediment is discussed below:

- Timber harvest and related activities (creation of skid trails, log landings, etc.)
- Transportation improvements (road construction, road decommission, maintenance, etc.)
- Dormant and growing season prescribed burns
- Construction of control lines for prescribed burning
- Recreational construction and management
- Use of herbicides for timber stand improvements.

Timber harvest and related activities (creation of skid trails, log landings, etc.)

Proposed silvicultural activities include 251 acres of pine maintenance/restoration. Streamside filter zone standards (Forest Wide Standards FW-3, FW-6, FW-7 FW-8 and FW-9) would be employed between ground disturbing activities and streams. These standards minimize the movement of sediment into streams. On April 4, 2012, Jim Herrig (Forest Aquatic Biologist) and Ali Reddington (Forest Hydrologist) visited the most recent timber activity (closed in 2004) in this watershed (White Oak Flats Timber Harvest) to evaluate sediment runoff from the timbering activity and the associated skid trails. We observed a very dense growth of young trees in both a clear cut and shelterwood with a deep layer of leaves and other organic matter completely covering the forest floor. No sheet or rill erosion was evident. Skid trails were well blended into the topography of the sites; showed no signs of channeling storm flows or sediment accumulation; and would not be recognizable to casual observers. The unnamed perennial stream that drains from the northwest side of compartment 25 stand 7 (clear cut) had no accumulation of fine sediment near its confluence with Citico Creek. Forestry management monitoring on the National Forests of North Carolina (Reddington 2012) found that standards similar to those utilized on the Cherokee National Forest were more than 90% effective at controlling sediment.

Full implementation of the proposed timber harvests and related activities with consideration of the Forest Plan standards (USDA Forest Service 2004a) would result in an insignificant increase in sediment. This activity may indirectly affect but is not likely to adversely affect the Citico darter, smoky madtom, yellowfin madtom, snail darter, or the smoky madtom critical habitat because the amount of sediment added to Citico Creek is insignificant.

Transportation improvements (road construction, road decommission, maintenance, etc.)

Streamside filter zone standards (USDA Forest Service 2004a; Forest Wide Standards: FW-3, FW-4, FW-5, FW-6, FW-7 and FW-11) would be employed between ground disturbing activities and streams. These standards minimize the movement of sediment into streams.

Existing roads whether open or closed to the public, are often poorly located from a hydrological standpoint and chronically contribute sediment to the aquatic systems (Swift 1985). Most roads on the Forest were laid out prior to enactment of environmental standards for protecting aquatic resources. Current road construction, reconstruction, and maintenance standards comply with these environmental standards and protect aquatic resources (USDA Forest Service 2004a; Forest Wide Standards: FW-121, FW-122, FW-123, FW-124, and FW-125). Decommissioning and replacing all the poorly situated roads is financially impractical. Consequently, improvements are made to the existing road profiles when the opportunities are present but sediment from roads remains a constant.

Existing open and closed roads within the Citico Creek project area and especially those associated with the White Oak Flats timber harvest which closed in 2004 were inspected for sediment runoff problems. Most roads (see Transportation Analysis Plan) produce some sediment from ditches or direct runoff. Efforts have been made to reduce the direct sediment input by paving road sections (Citico Road FSR 35-1) that have no filter strip between the road shoulder and the stream bank. Other maintenance and improvements that have been made include replacing ditches with Coweeta dips (Swift 1985). Most roads are stable with little surface erosion; however, some do not have enough Coweeta dips and need to be stabilized to retain surface material.

Full implementation of the proposed transportation improvement activities, including road decommissioning and maintenance, with consideration of the Forest Plan standards (USDA Forest Service 2004a) may result in a decrease in sediment load (for the watershed). This activity may indirectly affect but is not likely to adversely affect the Citico darter, smoky madtom, yellowfin madtom, snail darter, or the smoky madtom critical habitat because the amount of sediment added to Citico Creek is insignificant or may decrease from the existing level.

Dormant and growing season prescribed burns

Nine units (18,600 acres) are proposed for prescribed burning with about 1.3 miles of ground disturbance from fire line construction. Not all units would be burned in the same year. The purposes of prescribed burns are "...to achieve ecological sustainability, rehabilitation, and restoration of fire dependent and associated communities..." (USDA Forest Service 2004a; Goal 21) and to reduce hazardous fuels (USDA Forest Service 2004a; Goal 24).

Prescribed burns are implemented under a Burn Plan which provides operational parameters designed to achieve the goals and objectives of the Forest Plan (USDA Forest Service 2004a). Ecological restoration requires that fires not reach such intense heat that they remove all of the organic matter in upper soil layers. Low to moderate intensity and low severity fires are

designed to reduce the litter layer but leave the duff layer intact. Little soil should be exposed to minimize erosion (Elliot and Vose 2005). Having observed many prescribed burns on the Forest, I am confident that erosion is insignificant when Forest Plan Goal 21 (USDA Forest Service 2004a) and the Burn Plan are followed. Swift, et al. (1993) monitored sediment movement from prescribed burns at the Coweeta Hydrological Laboratory in western North Carolina. They recorded little soil and organic material movement from burn blocks; most of this sediment was trapped in the filter zone between the burn block and active streams. Reddington (2012) found that since little of the duff layer is consumed, soil structure and erosion rates are unaffected by prescribed burns; consequently, little, if any, mineral soil would be exposed.

Full implementation of the proposed prescribed burns with consideration of the Forest Plan Goal 21 (USDA Forest Service 2004a) and Burn Plan would result in an insignificant increase in sediment. This activity may indirectly affect but is not likely to adversely affect the Citico darter, smoky madtom, yellowfin madtom, snail darter, or the smoky madtom critical habitat because the amount of sediment added to Citico Creek is insignificant.

Construction of control lines for prescribed burning

Most of the sediment associated with prescribed burns comes from the fire lines as opposed to the burn area because fire lines physically remove all of the leaf litter and duff layers down to mineral soil leaving an exposed area that responds to precipitation similar to woods road that have not been graveled, ditched or sloped properly. To minimize the length of fire line that requires exposure of mineral soil, the fire planner designates (USDA Forest Service 2004a; standard FW-92) most of the fire line as existing roads, trails, or stream/riparian areas. Roads (open or closed), trails, and stream channels require little treatment to be effective fire lines. Leaf blowers are often all the treatment they receive; although large trees lying across the defined line may be cut with chainsaws.

The proposed prescribed burning requires 1.3 miles of dozer lines out of 97 total miles of fire line. Forest Plan (USDA Forest Service 2004a) standard FW-88 requires construction of water diversions into dozer lines as they are built to minimize soil runoff; and to re-seed and rehabilitate fire lines after the prescribed burning operation is completed. RX11-13 restricts dozer lines in riparian areas.

Full implementation of the proposed construction of control lines for prescribed burning with consideration of the Forest Plan (USDA Forest Service 2004a) standards (FW-88, FW-92, and RX-11-13) would result in an insignificant increase in sediment reaching the aquatic habitats. This activity may indirectly affect but is not likely to adversely affect the Citico darter, smoky madtom, yellowfin madtom, snail darter, or the smoky madtom critical habitat because the amount of sediment added to Citico Creek is insignificant.

Recreational construction and management

The proposed activities include: 1) addition of 39.9 miles (includes 1.2 miles of connector trail discussed in 4 below) of equestrian trails; 2) construction of a 1.5 acre parking area designed for horse trailers at the end of NFSR 44291 (Millers Ridge area in the Ball Play watershed); 3) conversion of a portion of Young Branch Campground to a day use recreation site; 4) construction of a 1.2 mile connector trail from Young Branch Campground to Little Citico Bridge; 5) improvement on approximately 1,300 feet of equestrian trail 165-3; 6) close 2.6 miles of equestrian trails 165-1 and 165-2; 7) reclassify Mill Branch hiking trail as a dual equestrian/hiking trail; 8) construct a non-potable well at Young Branch campground for

watering horses; 9) install barricades to prevent equestrian access to Citico Creek; 10) install kiosks and/or develop other educational methods in the Citico Creek corridor to provide information to visitors about Citico Creek; and 11) close Citico Creek to equestrian use from Bark Camp Branch confluence downstream to Forest boundary.

Recreational Activity 1

Of the 39.9 miles of new trails, 23.8 miles would be located on existing roads/trails. Approximately 16.1 miles of connector trails would be located in areas that minimize the likelihood of sediment reaching streams. Roads that would be used as part of the complex, generally, meet the Forest Plan (USDA Forest Service 2004a) standards (see discussion in the Transportation Improvements section above) and would be improved and maintained. New trail construction would comply with the Forest Plan (USDA Forest Service 2004a) standards FW-2, FW-3, FW-4, FW-5, FW-7, RX11-15, RX11-17, RX11-18, and RX11-19. These standards were designed for road construction and maintenance; they are at least as effective in restricting sediment runoff from new trails because trails are narrower than roads and require less ground disturbance. Riparian area disturbance would be minimal with no trail crossings in Citico Creek.

Full implementation of the proposed new trails built to equestrian standards with consideration of the Forest Plan (USDA Forest Service 2004a) standards cited above would result in an insignificant increase in sediment reaching the aquatic habitats. This activity may affect but is not likely to adversely affect the Citico darter, smoky madtom, yellowfin madtom, snail darter, or the smoky madtom critical habitat because the amount of sediment added to Citico Creek is insignificant.

Recreational Activity 2

The construction of a 1.5 acre parking area located on the west side of Miller Ridge in the Ball Play watershed would not contribute any sediment to Citico Creek. The same streamside filter zone standards applied during road construction would be employed during the parking area construction (see discussion above). The parking area would be located on a ridge line with no streams in close proximity. Any sediment would drain towards Ball Play Creek which supports populations of rainbow trout and blacknose dace in the headwaters. Nine other fish species are known to occur in this stream but none are rare.

Construction of the horse trailer parking area with full implementation of the Forest Plan (USDA Forest Service 2004a) standards would result in an insignificant increase in sediment reaching the aquatic habitats; none would go into the Citico Creek watershed. This activity would have no effect on the Citico darter, smoky madtom, yellowfin madtom, snail darter, or the smoky madtom critical habitat because no sediment would be added to Citico Creek.

Recreational Activities 3 and 4

The conversion of a portion of Young Branch Campground to a day use recreation site and the construction of a 1.2 mile connector trail from Young Branch Campground to Little Citico Bridge are discussed in the direct effects section.

Recreational Activities 5 and 6

Improvements on 1,300 feet of Trail 165-3 would provide an alternate route to trail 165-2, for horseback riders, which avoids Little Citico Creek but allows them to reach the same destination. The 2.6 miles of horse trail (165-1 and 165-2) that are proposed for decommissioning are poorly located and/or causing chronic sedimentation in Little Citico Creek and Citico Creek.

Full implementation of the proposed trail decommissioning (165-1 and 165-2) and the improvement to 1300 feet of trail 165-3 would result in a decrease in sediment reaching the aquatic habitats. This activity may indirectly affect but is not likely to adversely affect the Citico darter, smoky madtom, yellowfin madtom, snail darter, or the smoky madtom critical habitat because the amount of sediment added to Citico Creek is insignificant or may decrease from the current level.

Recreational Activity 7

Reclassifying Mill Branch hiking trail (Trail-96) to allow horse traffic also requires the reconstruction of about 0.5 miles of the trail to improve the grade and width to accommodate horses. This activity would be done with hand tools because the trail is within a wilderness area. All trail construction and maintenance standards described above would be followed.

Full implementation of the proposed reclassification to permit horse traffic with consideration of the Forest Plan (USDA Forest Service 2004a) standards cited above would result in an insignificant increase in sediment reaching the aquatic habitats. This activity may indirectly affect, but is not likely to adversely affect the Citico darter, smoky madtom, yellowfin madtom, snail darter, or the smoky madtom critical habitat because the amount of sediment added to Citico Creek is insignificant.

Recreational Activities 8, 9, 10 and 11

The construction of a non-potable well at Young Branch Campground for watering horses; installation of barricades to prevent equestrian access to Citico Creek; the installation of kiosks and/or develop other educational methods in the Citico Creek corridor to provide information to visitors about Citico Creek; and the closure of Citico Creek to equestrian use from Bark Camp Branch confluence downstream to Forest boundary are all discussed in the direct effects section.

Use of herbicides for timber stand improvements

Herbicides would be used during timber stand improvement, site preparation activities, along road right of ways, and to treat invasive species. Forest Wide standards FW-14, FW-15, and FW-16; (USDA Forest Service 2004a) would be followed during implementation. Reddington (2012) concluded that the small amount of herbicide applied in compliance with the Forest Standards and BMP's would have negligible effects on aquatic habitats.

Full implementation of the proposed use of herbicides for timber stand improvements with consideration of the Forest Plan (USDA Forest Service 2004a) standards would not result in a degradation of aquatic habitats. This activity may indirectly affect but is not likely to adversely affect the Citico darter, smoky madtom, yellowfin madtom, snail darter, or smoky madtom critical habitat because the amount of herbicide expected to reach Citico Creek is insignificant.

Cumulative Effects - smoky and yellowfin madtoms, Citico and snail darters

No known cumulative effects would occur in the project area because no known State or private activities are reasonably certain to occur within the project area. Therefore, no cumulative effects to Citico darter, smoky madtom, yellowfin madtom, snail darter and smoky madtom critical habitat would occur.

Determination of Effect - smoky and yellowfin madtoms, Citico and snail darters

Restricting horse access to Citico Creek, installing kiosks, developing public education programs, and removing dams as soon as they are built would have positive direct effects on the Citico darter, smoky madtom, yellowfin madtom, snail darter and smoky madtom critical habitat because they lessen the disturbance of the stream bottom.

Indirect effects of implementing the proposed alternative would result in insignificant sedimentation and herbicides reaching Citico Creek because the Forest Plan standards for ground disturbing activities and herbicidal treatments would be followed and these standards have been shown to adequately protect these species (USDA Forest Service 2004b). Indirect effects of the proposed alternative may affect but are not likely to adversely affect the Citico darter, smoky madtom, yellowfin madtom, snail darter and smoky madtom critical habitat because the sediment and herbicide levels reaching Citico Creek are insignificant.

There are no cumulative effects because no known State or private activities are reasonably certain to occur within the project area.

4.0 SUMMARY OF EFFECTS DETERMINATIONS

Table 6 summarizes the determinations of effect for each species. Detailed analysis is provided above for each species.

Table 6. Determination of Effects

Species	FWS Status	Determination of Effect
Indiana bat	E	May affect, likely to adversely affect
small whorled pogonia	T	May affect, not likely to adversely affect
Citico darter	E	May affect, not likely to adversely affect
smoky madtom	E	May affect, not likely to adversely affect
yellowfin madtom	T	May affect, not likely to adversely affect
snail darter	T	May affect, not likely to adversely affect
smoky madtom critical habitat	-	May affect, not likely to adversely affect

5.0 SIGNATURE(S) OF PREPARER(S)

/s/ Jim Herrig
Forest Aquatic Biologist
December 10, 2012

With contributions from:
Mark Pistrang: Forest Botanist/Ecologist
Laura Morris: South Zone Wildlife Biologist

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